

FILE 'REGISTRY'

L1 5 S (K AND AL AND B AND O)/ELS AND 4/ELC.SUB  
L2 1 S 88160-55-8/RN

FILE 'HCAPLUS'

L3 317 S K2AL2B2O7 OR KAB OR KABO  
L4 30534 S POTASSIUM(N)ALUMINUM(W)BORATE OR BORIC(W)ACID  
L5 164298 S NONLINEAR? OR NON(W)LINEAR?  
L6 1744009 S CRYSTAL?  
L7 689514 S OPTICAL  
L8 883543 S LED OR LIGHT(A)EMIT? OR LUMINANCE OR  
LUMINESCENCE OR PHOTOLUMIN? OR ILLUMIN? OR ILLUME? OR  
ILLUMINE?  
OR LASER OR PLD OR OPTIC  
L9 21 S L1 OR L2  
L10 30833 S (L3 OR L4) NOT L9  
L11 2814 S L10 AND L6  
L12 205 S L11 AND L8  
L13 43 S L5 AND L12  
L14 40 S L3 AND L6  
L15 22 S L14 NOT (L9 OR L13)

03/13/2003

L9 ANSWER 1 OF 21 HCPLUS COPYRIGHT 2003 ACS  
AN 2002:380808 HCPLUS  
DN 137:161015  
TI The crystal growth and nonlinear optical properties of K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub>  
AU Hu, Zhang-Gui; Ushiyama, Naoki; Yap, Yoke Khin; Yoshimura, Masashi; Mori, Yusuke; Sasaki, Takatomo  
CS Department of Electrical Engineering, Osaka University, Suita, Osaka, 565-0871, Japan  
SO Journal of Crystal Growth (2002), 237-239(Pt. 1), 654-657  
CODEN: JCRCGA; ISSN: 0022-0248  
PB Elsevier Science B.V.  
DT Journal  
LA English  
AB High-quality K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (KAB) crystal with a dimension of (15.times.12.times.4 mm<sup>3</sup>) was grown by a modified middle-seeded soln. growth method. This result allowed the authors to characterize nonlinear optical (NLO) properties of KAB for the generation of UV light. From the authors' result, KAB possesses moderate birefringence for UV light generation, a significant effective NLO coeff. and is chem. as well as phys. stable for practical applications.  
IT 88160-55-8, Aluminum potassium borate (Al<sub>2</sub>K<sub>2</sub>B<sub>2</sub>O<sub>7</sub>)  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)  
(crystal growth and nonlinear optical properties of K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub>)  
RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 2 OF 21 HCPLUS COPYRIGHT 2003 ACS  
AN 2002:65223 HCPLUS  
DN 136:332925  
TI Growth of large K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> crystals  
AU Zhang, Chengqian; Wang, Jiyang; Hu, Xiaobo; Jiang, Huaidong; Liu, Yaogang; Chen, Chuangtian  
CS The State Key Laboratory of Crystal Materials, Shandong University, Jinan, 250100, Peop. Rep. China  
SO Journal of Crystal Growth (2002), 235(1-4), 1-4  
CODEN: JCRCGA; ISSN: 0022-0248  
PB Elsevier Science B.V.  
DT Journal  
LA English  
AB High optical quality crystals of K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (KABO) up to 50.times.20.times.17 mm<sup>3</sup> in size and wt. of 30 g were grown using an improved top-seeded growth method with a NaF flux. The solv. data of KABO in NaF is reported at 920-790.degree. and the effect of seed orientations on the crystal growth was studied. Seed along (110) direction is the best choice for the growth of this crystal. The quality of the crystals was evaluated by synchrotron topog. method and a D5000 high resoln. x-ray diffractometer. The conversion efficiency of the 4th harmonic generation with a specimen 3.7 mm in length reached 12.3% for Q-switched Nd:YAG lasers.  
IT 88160-55-8, Aluminum potassium borate (Al<sub>2</sub>K<sub>2</sub>B<sub>2</sub>O<sub>7</sub>)  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)  
(crystal growth by improved top-seeded growth method with NaF flux and characterization)  
RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 3 OF 21 HCPLUS COPYRIGHT 2003 ACS  
AN 2001:890549 HCPLUS

03/13/2003

DN 136:109635  
TI Synthesis and growth of a new NLO crystal K2Al2B2O7  
AU Zhang, Cheng-qian; Wang, Ji-yang; Hu, Xiao-bo; Jiang, Huai-dong; Li, Jing;  
Liu, Yao-gang; Qi, Hua; Wu, Yi-cheng; Cheng, Chuang-tian  
CS State Key Lab. of Crystal Materials, Shandong University, Jinan, 250100,  
Peop. Rep. China  
SO Rengong Jingti Xuebao (2001), 30(4), 325-329  
CODEN: RJXUEN; ISSN: 1000-985X  
PB Rengong Jingti Xuebaoshe  
DT Journal  
LA Chinese  
AB K2Al2B2O7 (KABO) was synthesized by a solid state reaction in high temp.  
The flux systems for the growth of KABO crystals were studied with a  
spontaneous nucleation method. NaF is available for the growth of KABO  
crystals. The suitable proportion is KABO:NaF = 1:2. The effects of seed  
directions on the growth of KABO crystals are discussed. And seeds along  
[110] direction are favorable for the growth of KABO crystals. A crystal  
with dimensions of 50 .times. 20 .times. 17 mm<sup>3</sup> and wt. of 30 g was grown  
with a top seeded growth method (TSGM) using NaF as a flux.  
IT 88160-55-8P, Aluminum potassium borate (Al2K2B2O7)  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN  
(Synthetic preparation); PREP (Preparation); PROC (Process)  
(synthesis and growth of nonlinear optical crystal)

L9 ANSWER 4 OF 21 HCPLUS COPYRIGHT 2003 ACS  
AN 2001:559084 HCPLUS  
DN 135:378864  
TI Top-seeded growth of K2Al2B2O7  
AU Zhang, C.; Wang, J.; Hu, X.; Liu, H.; Wei, J.; Liu, Y.; Wu, Y.; Chen, C.  
CS The State Key Laboratory of Crystal Materials, Shandong University, Jinan,  
250100, Peop. Rep. China  
SO Journal of Crystal Growth (2001), 231(4), 439-441  
CODEN: JCRGAE; ISSN: 0022-0248  
PB Elsevier Science B.V.  
DT Journal  
LA English  
AB New nonlinear optical crystals of the material K2Al2B2O7 (KABO) with  
dimensions reaching 38.times.15.times.10 mm<sup>3</sup> and wt. of 11.5 g were grown  
by the top-seeded growth method using NaF as a flux. The morphol. faces  
are {001}, {100} and {110}, which were characterized by x-ray diffraction  
methods. The problem of its layer growth habit is solved by the selection  
of a suitable flux. Some addnl. flux-systems are also discussed.  
IT 88160-55-8, Aluminum potassium borate (Al2K2B2O7)  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(crystal growth of nonlinear optical material K2Al2B2O7 by top-seeded  
growth method using NaF flux)  
RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 5 OF 21 HCPLUS COPYRIGHT 2003 ACS  
AN 2001:317479 HCPLUS  
DN 135:68734  
TI The growth of K2Al2B2O7 (KAB) crystal by modified middle seeded solution  
growth (MSSG) method  
AU Hu, Zhang-Gui; Ushiyama, Naoki; Yap, Yoke Khin; Yoshimura, Masashi; Mori,  
Yusuke; Sasaki, Takatomo  
CS Department of Electrical Engineering, Osaka University, Suita, 565-0871,  
Japan  
SO Japanese Journal of Applied Physics, Part 2: Letters (2001), 40(4B),  
L393-L395  
CODEN: JAPLD8; ISSN: 0021-4922

03/13/2003

PB Japan Society of Applied Physics

DT Journal

LA English

AB Among many nonlinear optical (NLO) crystals, Sr<sub>2</sub>Be<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (SBBO) and structurally related crystals is promising for the generation of UV and vacuum-UV (VUV) light. However, high viscosity, volatility and the platy growth habit have limited the growth of thick crystals for actual NLO applications. The growth of these crystals to a significant thickness has perplexed researchers in the past decade. The K<sub>2</sub>Al<sub>12</sub>B<sub>2</sub>O<sub>7</sub> (KAB) is a new NLO borate crystal discovered in the authors' lab. KAB possesses a layered structure similar to SBBO and thus is another potential UV NLO crystal. A modified middle-seeded soln. growth (MSSG) method was adopted to grow KAB crystals. High-quality, bulk KAB crystals with dimensions of 12 .times. 10 .times. 6.5 t mm<sup>3</sup> were grown. To the authors' knowledge, among NLO borate crystals that have similar structure like the SBBO crystal, KAB is the 1st one that can be grown to such dimensions to meet the requirement for proper measurement of linear and nonlinear optical properties.

IT 88160-55-8, Aluminum potassium borate (Al<sub>2</sub>K<sub>2</sub>B<sub>2</sub>O<sub>7</sub>)

RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(crystal growth by modified middle seeded soln. growth method)

RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 6 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 2001:208524 HCAPLUS

DN 134:229453

TI Laser device and exposure method

IN Ohtsuki, Tomoko

PA Nikon Corp., Japan

SO PCT Int. Appl., 73 pp.

CODEN: PIXXD2

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001020397	A1	20010322	WO 2000-JP6131	20000908
	W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM			
	RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG			

PRAI JP 1999-258133 A 19990910

AB A laser device which can be used as a light source for an exposure device, can be down-sized, and is easy to maintain. A laser beam emitted from a DFB semiconductor laser, for example, and amplified by an optical fiber amplifier is passed through nonlinear optical crystals to be sequentially doubled in frequency to thereby generate an UV-region laser beam consisting of an octuple wave. A GdYCOB, i.e., Gd<sub>x</sub>Y<sub>1-x</sub>Ca<sub>4</sub>O(BO<sub>3</sub>)<sub>3</sub> crystal (0 < x < 1), is used for the nonlinear optical crystal for a double wave-to-quadruple wave conversion, and a KAB, i.e., K<sub>2</sub>Al<sub>12</sub>B<sub>2</sub>O<sub>7</sub> crystal for the nonlinear optical crystal for a quadruple wave-to-octuple wave conversion. The nonlinear optical crystals are all fine-tuned in phase match angle by temp. controllers, resp.

IT 88160-55-8, Aluminum potassium borate oxide (Al<sub>2</sub>K<sub>2</sub>(BO<sub>3</sub>)<sub>2</sub>O)

RL: DEV (Device component use); USES.(Uses)

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(laser device and exposure method)

RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 7 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 2001:107055 HCAPLUS  
DN 137:70081  
TI New nonlinear optical crystal K2Al2B207. [Erratum to document cited in CA132:354434]  
AU Ye, Ning; Zeng, Wenrong; Jiang, Jie; Wu, Baichang; Chen, Chuangtian; Feng, Baohua; Zhang, Xiulan  
CS Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, 350002, Peop. Rep. China  
SO Journal of the Optical Society of America B: Optical Physics (2001), 18(1), 122  
CODEN: JOBPDE; ISSN: 0740-3224  
PB Optical Society of America  
DT Journal  
LA English  
AB In Eq. (1b), the B value for the extraordinary index should be 0.00974.  
IT 88160-55-8, Aluminum potassium borate (Al2K2B207)  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(growth and optical properties of new nonlinear optical crystal K2Al2B207 (Erratum))  
RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 8 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 2000:714868 HCAPLUS  
DN 134:154477  
TI Recent development of nonlinear optical borate crystals: key materials for generation of visible and UV light  
AU Sasaki, T.; Mori, Y.; Yoshimura, M.; Yap, Y. K.; Kamimura, T.  
CS Sasaki Laboratory, Department of Electrical Engineering, Osaka University, Suita, Osaka, 565-0871, Japan  
SO Materials Science & Engineering, R: Reports (2000), R30(1-2), 1-54  
CODEN: MIGIEA; ISSN: 0927-796X  
PB Elsevier Science S.A.  
DT Journal; General Review  
LA English  
AB A review with 187 refs. The development of nonlinear optical (NLO) borate crystals for generation of visible and UV light is reviewed. The authors 1st discussed on the basic principles of laser frequency conversion. Then, the authors examine the trends in research on NLO crystals. The background and present status of NLO borate crystals are summarized. The main considerations are focused on the discussion of crystals like CsLiB6O10 (CLBO), GdxY1-xCa4O(BO3)3 (GdYCOB) and K2Al2B207 (KAB). Properties of related materials like .beta.-BaB2O2 (BBO), LiB3O5 (LBO), KBe2BO3F2 (KBBF), Sr2Be2B07 (SBBO), CsB3O5 (CBO), GdCa4O(BO3)3 (GdCOB) and YCa4O(BO3)3 (YCOB) are included for comparison. The authors aim to provide a complete view of developing a new NLO borate material for actual laser applications. This review covers various aspects including the search for new materials, the growth of bulk crystals, the characterization of crystal properties as well as the development of new techniques to overcome obstacles in actual laser application, namely, thermal dephasing and laser-induced damage. Finally, perspectives on NLO borate crystals and all-solid-state UV lasers are evaluated.  
IT 88160-55-8P, Aluminum potassium borate oxide (Al2K2(BO3)2O)  
RL: PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation)

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(prepn., crystal structure, and optical properties of)  
RE.CNT 193 THERE ARE 193 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 9 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 2000:345956 HCAPLUS  
DN 132:354981  
TI Solving crystal structures of inorganic, organic, and coordination  
compounds using synchrotron powder data  
AU Kaduk, James A.  
CS BP Amoco p.l.c, Naperville, IL, 60566, USA  
SO Advances in X-Ray Analysis (2000), 42, 333-354  
CODEN: AXRAAA; ISSN: 0376-0308  
PB International Centre for Diffraction Data  
DT Journal; (computer optical disk)  
LA English  
AB The crystal structures of K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (I), di-Me 2,7-naphthalenedicarboxylate (II), and diammonium terephthalate (III) were solved using synchrotron powder data. The patterns were measured from 6-74.degree. for 2.theta. in 0.004.degree. steps with 4 s/step for I, 5-35.degree. 2.theta. in 0.004.degree. steps with 1.2 s/step for II, and 3-70.degree. for 2.theta. in 0.02.degree. steps with 1.2 s/step for III. The following crystallog. parameters found are: a = 8.55802(2), c = 8.45576 (3) .ANG. for I, a = 24.4846, b = 6.0652, c = 3.9549 .ANG., .beta. = 92.4845.degree. and V = 586.78 .ANG.3 for II, and a = 4.0053(5), b = 11.8136(21), c = 20.1857(24) .ANG. for III. The at. coordinate and displacement parameters for all 3 compds. are presented and the refinement of the structures is discussed with residuals given.  
IT 88160-55-8, Aluminum potassium borate (Al<sub>2</sub>K<sub>2</sub>B<sub>2</sub>O<sub>7</sub>)  
RL: PRP (Properties)  
(crystal structure of K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> solved by synchrotron powder  
diffractometry)

RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 10 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 2000:293528 HCAPLUS  
DN 132:354434  
TI New nonlinear optical crystal K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub>  
AU Ye, Ning; Zeng, Wenrong; Jiang, Jie; Wu, Baichang; Chen, Chuangtian; Feng, Baohua; Zhang, Xiulan  
CS Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, 350002, Peop. Rep. China  
SO Journal of the Optical Society of America B: Optical Physics (2000), 17(5), 764-768  
CODEN: JOBPDE; ISSN: 0740-3224  
PB Optical Society of America  
DT Journal  
LA English  
AB The new nonlinear optical crystal K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> is discovered with the mol. engineering approach on the basis of anionic group theory. An optically perfect single crystal with space group P321, free of moisture and hygroscopy, is readily grown by the top-seeding flux method. Its transparency range covers 180-3600 nm. The refractive indexes are measured with the min.-deviation method, based on which the Sellmeier equation is obtained. The measured nonlinear optical coeff. d<sub>11</sub> is 0.45 pm/V. The moderate walk-off angle and angular bandwidth, together with the high optical homogeneity, make it a promising candidate for the 4th- and the 5th-harmonic generation of a Nd:YAG laser.  
IT 88160-55-8, Aluminum potassium borate (Al<sub>2</sub>K<sub>2</sub>B<sub>2</sub>O<sub>7</sub>)  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM

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(Technical or engineered material use); PROC (Process); USES (Uses)  
(growth and optical properties of new nonlinear optical crystal  
K2Al2B207)

RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 11 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 2000:251722 HCAPLUS  
DN 132:300584  
TI Flux growth of the new nonlinear optical crystal: K2Al2B207  
AU Hu, Z.-G.; Higashiyama, T.; Yoshimura, M.; Mori, Y.; Sasaki, T.  
CS Department of Electrical Engineering, Osaka University, Suita, Osaka,  
Japan  
SO Journal of Crystal Growth (2000), 212(1/2), 368-371  
CODEN: JCRGAE; ISSN: 0022-0248  
PB Elsevier Science B.V.  
DT Journal  
LA English  
AB A new nonlinear optical K2Al2B207 (KAB) crystal with a dimension of 2 mm  
thickness was grown by top-seeded soln. growth (TSSG) using K2CO3-B2O3  
fluxes. The viscosity of the KAB-K2CO3-B2O3 and KAB-K2CO3-B2O3-NaF (or  
LiCl and KF) solns. were measured. The KAB growth habit, viscosity and  
soln. homogeneity are discussed.  
IT 88160-55-8P, Aluminum potassium borate (Al2K2B207)  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN  
(Synthetic preparation); PREP (Preparation); PROC (Process)  
(flux growth and properties of new nonlinear optical crystal of  
K2Al2B207)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 12 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 2000:117257 HCAPLUS  
DN 132:144259  
TI Nonlinear optical crystal  
IN Sasaki, Takatomo; Mori, Yusuke; Yoshimura, Masashi  
PA Japan Science and Technology Corporation, Japan  
SO PCT Int. Appl., 16 pp.  
CODEN: PIXXD2  
DT Patent  
LA Japanese  
FAN.CNT 1  
PATENT NO. KIND DATE APPLICATION NO. DATE  
----- ----- ----- -----  
PI WO 2000008524 A1 20000217 WO 1999-JP4199 19990804  
W: CA, CN, JP, KR, US  
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,  
PT, SE  
EP 1103843 A1 20010530 EP 1999-935049 19990804  
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,  
IE, SI, LT, LV, FI, RO  
PRAI JP 1998-220914 A 19980804  
WO 1999-JP4199 W 19990804  
AB A nonlinear optical crystal which is represented by the formula:  
K2Al2B207, a method for wavelength conversion using the optical crystal,  
and an element and a wavelength conversion app. for use in practicing the  
method. This nonlinear optical crystal is the one for generating vacuum  
UV rays which can be grown with ease and is advantageous in practical use.  
IT 88160-55-8, Aluminum potassium borate oxide (Al2K2(BO3)2O)  
RL: DEV (Device component use); USES (Uses)  
(nonlinear optical aluminum potassium perborate crystal)

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RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 13 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 2000:36037 HCAPLUS  
DN 132:187872  
TI Crystal structures of metal aluminum borates  
AU Kaduk, James A.; Satek, Larry C.; McKenna, Stephen T.  
CS BP Amoco p.l.c., Naperville, IL, 60566, USA  
SO Rigaku Journal (1999), 16(2), 17-30  
CODEN: RIJOFV; ISSN: 0913-543X  
PB Rigaku Corporation  
DT Journal  
LA English  
AB The crystal structures of K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> and SrAl<sub>2</sub>B<sub>2</sub>O<sub>7</sub> were solved ab initio by applying traditional single crystal techniques to structure factors extd. from x-ray powder patterns. K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> crystallizes in the trigonal space group P321, with a 8.55802(2), c 8.45576(3) .ANG., and Z = 3. The structure consists of a 3-dimensional network composed of corner-sharing BO<sub>3</sub> triangles and Al<sub>2</sub>O<sub>7</sub> units. The BO<sub>3</sub> groups lie approx. parallel to the ab plane, and the planes contg. them are joined by Al<sub>2</sub>O<sub>7</sub> pillars parallel to c. The K cations reside in channels parallel to c. SrAl<sub>2</sub>B<sub>2</sub>O<sub>7</sub> crystallizes in the rhombohedral space group R32, with a 4.90363(9), c 23.9346(6) .ANG., and Z = 3. In this structure also, Al<sub>2</sub>O<sub>7</sub> act as pillars between planes contg. BO<sub>3</sub> units. The structure is, however, layered, as the Al<sub>2</sub>O<sub>7</sub> join pairs of BO<sub>3</sub> planes. An ABC stacking sequence of these double layers creates trigonal prismatic cavities, in which the Sr reside. The av. structure of Cu<sub>2</sub>Al<sub>6</sub>B<sub>4</sub>O<sub>17</sub> was confirmed to higher accuracy and precision by a resonant scattering study. This compd. crystallizes in the tetragonal space group I4/m, with a 10.57945(1), c 5.67357(6) .ANG., and Z = 2. A new model for the local structure is proposed. Cu<sup>2+</sup> and Al<sup>3+</sup> equally occupy a trigonal bipyramidal site. The Cu occur as cis pairs around a 4-ring of these 5-coordinate sites. A square planar O is displaced from the center of this 4-ring toward the pair of Al and away from the pair of Cu cations. The Cu<sup>2+</sup> and Al<sup>3+</sup> apparently occupy different locations in the coordination sphere at low temps., only moving to a common site as the calcination temp. is raised. Both the crystallinity and av. crystallite size of this material can be controlled by controlling the calcination temp.  
IT 88160-55-8, Aluminum potassium borate (Al<sub>2</sub>K<sub>2</sub>B<sub>2</sub>O<sub>7</sub>)  
RL: PRP (Properties)  
(crystal structure of)

RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 14 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1999:619567 HCAPLUS  
DN 131:279494  
TI Redetermination of the crystal structure of dipotassium dialuminum borate, K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub>, a new nonlinear optical material  
AU Hu, Z.-G.; Higashiyama, T.; Yoshimura, M.; Mori, Y.; Sasaki, T.  
CS Department Electrical Engineering, Osaka Univ., Suita, 565, Japan  
SO Zeitschrift fuer Kristallographie - New Crystal Structures (1999), 214(4), 433-434  
CODEN: ZKNSFT; ISSN: 1433-7266  
PB R. Oldenbourg Verlag  
DT Journal  
LA English  
AB Crystals of the title compd. are trigonal, space group P321, a 8.5657(9), c 8.463(2) .ANG.; Z = 3; R = 0.018, R<sub>w</sub>(F<sub>2</sub>) = 0.060 for 2168 reflections. At. coordinates are given. During the redetn. of the crystal structure

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the crystal class was changed from hexagonal to trigonal. The structure is built up by layers of AlO<sub>4</sub> tetrahedra and BO<sub>3</sub> triangles.

IT 88160-55-8, Aluminum potassium borate oxide (Al<sub>2</sub>K<sub>2</sub>(BO<sub>3</sub>)<sub>2</sub>O)  
RL: PRP (Properties)

(redetn. of crystal structure of)

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 15 OF 21 HCPLUS COPYRIGHT 2003 ACS

AN 1999:184392 HCPLUS

DN 130:303686

TI K2Al2B2O7 - a new nonlinear optical crystal

AU Zhanggui, Hu; Mori, Y.; Higashiyama, T.; Yoshimura, M.; Yap, Y. K.; Kagebaysahi, Y.; Sasaki, T.

CS Department of Electrical Engineering, Osaka University, Suita, Osaka, 565-087, Japan

SO Proceedings of SPIE-The International Society for Optical Engineering (1998), 3556(Electro-Optic and Second Harmonic Generation Materials, Devices, and Applications II), 156-161

CODEN: PSISDG; ISSN: 0277-786X

PB SPIE-The International Society for Optical Engineering

DT Journal

LA English

AB A new NLO crystal K2Al2B2O7 (KAB) was discovered. The material crystallizes in the Trigonal system with a 8.5669(8) .ANG., c = 8.467(1) .ANG. and Z = 3, KAB possesses similar space arrangement of SBO. KAB crystal with a dimensions of 18 .times. 14 .times. 3 mm was grown by flux method. The optical properties of KAB were measured.

IT 88160-55-8, Aluminum potassium borate oxide (Al<sub>2</sub>K<sub>2</sub>(BO<sub>3</sub>)<sub>2</sub>O)

RL: PEP (Physical, engineering or chemical process); PRP (Properties);  
PROC (Process)

(nonlinear optical crystal)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 16 OF 21 HCPLUS COPYRIGHT 2003 ACS

AN 1999:184369 HCPLUS

DN 130:303685

TI Two new nonlinear optical crystals: BaAl2B2O7 and K2Al2B2O7

AU Ye, Ning; Zeng, Wenrong; Wu, Baichang; Chen, Chuangtian

CS Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, Fujian, 350002, Peop. Rep. China

SO Proceedings of SPIE-The International Society for Optical Engineering (1998), 3556(Electro-Optic and Second Harmonic Generation Materials, Devices, and Applications II), 21-23

CODEN: PSISDG; ISSN: 0277-786X

PB SPIE-The International Society for Optical Engineering

DT Journal

LA English

AB The new nonlinear optical crystals BaAl2B2O7 and K2Al2B2O7 are readily grown by top-seeded flux method. BaAl2B2O7 crystallizes in the rhombohedral space group R32 (Z = 3) in a cell of dimensions .alpha.=.beta.=5.001 .ANG., c 24.378 .ANG.. K2Al2B2O7 crystallizes in the trigonal space group P321 (Z = 3) in a cell of dimensions .alpha.=.beta.=8.530 .ANG., c 8.409 .ANG.. The theor. calcns. and the measurement of nonlinear optical effect indicates that the two crystals are phase-matchable with the nonlinear optical coeff. d11 = 0.75 pm/V for BaAl2B2O7 and d11 = 0.48 pm/V for K2Al2B2O7. The birefringence of BaAl2B2O7 is .DELTA.n = 0.063 and 0.068 for K2Al2B2O7.

IT 88160-55-8, Aluminum potassium borate oxide (Al<sub>2</sub>K<sub>2</sub>(BO<sub>3</sub>)<sub>2</sub>O)

RL: PRP (Properties)

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(two new nonlinear optical crystals BaAl<sub>2</sub>B<sub>2</sub>O<sub>7</sub> and K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> and their structural and optical properties)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 17 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1998:694043 HCAPLUS  
DN 129:348837  
TI A new nonlinear optical borate crystal K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (KAB)  
AU Hu, Zhang-Gui; Higashiyama, Tetsuji; Yoshimura, Masashi; Yap, Yoke Khin;  
Mori, Yusuke; Sasaki, Takatomo  
CS Department of Electrical Engineering, Osaka University, Osaka, 565-0871,  
Japan  
SO Japanese Journal of Applied Physics, Part 2: Letters (1998), 37(10A),  
L1093-L1094  
CODEN: JAPLD8; ISSN: 0021-4922  
PB Japanese Journal of Applied Physics  
DT Journal  
LA English  
AB A new nonlinear optical (NLO) borate crystal K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (K Al Borate, KAB)  
was discovered. The structure was established by 4-axis x-ray diffraction  
methods. The material crystallizes in the trigonal space group P321 with  
a 8.5657(9) .ANG., C = 8.463(2) .ANG. and Z = 3. KAB possesses a space  
arrangement similar to Sr<sub>2</sub>Be<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (SBBO). A KAB crystal with a dimensions  
of 30 x 15 x 1 mm<sup>3</sup> was grown using the Top-Seeded Soln. Growth (TSSG)  
method. The optical properties of KAB were measured.  
IT 88160-55-8, Aluminum potassium borate oxide (Al<sub>2</sub>K<sub>2</sub>(BO<sub>3</sub>)<sub>2</sub>)  
RL: PRP (Properties); TEM (Technical or engineered material use); USES  
(Uses)  
(nonlinear optical borate crystal K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub> and its structural  
properties)  
RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L9 ANSWER 18 OF 21 HCAPLUS COPYRIGHT 2003 ACS  
AN 1992:481632 HCAPLUS  
DN 117:81632  
TI Light metal oxide-based amorphous conductor  
IN Satek, Larry C.; Kaminsky, Mark P.; DeSimone, Richard E.  
PA Amoco Corp., USA  
SO U.S., 9 pp.  
CODEN: USXXAM  
DT Patent  
LA English  
FAN.CNT 1  
PATENT NO. KIND DATE APPLICATION NO. DATE  
----- ----- ----- -----  
PI US 5108658 A 19920428 US 1991-645541 19910124  
PRAI US 1991-645541 19910124  
AB A light metal oxide-based amorphous elec. conductor comprises an amorphous  
ternary compn. consisting of Al<sub>2</sub>O<sub>3</sub>, B<sub>2</sub>O<sub>3</sub>, and an oxide of a light metal  
selected from Group 1A and IIA. Amorphous conductors of the present  
invention can be produced by forming an aq. compn. comprising a source of  
light metal ions, a source of Al<sub>2</sub>O<sub>3</sub> and a source of B<sub>2</sub>O<sub>3</sub> to form a  
homogeneous gel, drying the gel to form a superficially dry solid, and  
calcining the dry solid at a sufficiently high temp. to form an amorphous  
ternary compn. as described above. The conductor is used as an element of  
a moisture and/or a high temp. sensor.  
IT 142616-84-0P, Aluminum potassium borate oxide  
RL: IMF (Industrial manufacture); PRP (Properties); PREP (Preparation)  
(manuf. of, elec. conductive, for temp. or moisture sensors)

03/13/2003

L9 ANSWER 19 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1992:60805 HCAPLUS

DN 116:60805

TI Stabilized chlorine-contg. polymer compositions

IN Shiichi, Ichiro; Nishimura, Masaru

PA Adeka Argus Chemical Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 7 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 03097748	A2	19910423	JP 1989-234252	19890908
PRAI	JP 1989-234252		19890908		

AB The title compns. contain Cl-contg. polymers, metal borates, and metal perchlorates. Thus, PVC 100, di(C8-12 alkyl) phthalate 70, epoxidized soybean oil 3.0, CaCO<sub>3</sub> 20, TiO<sub>2</sub> 10, Zn octylate 0.5, Ba stearate 1.0, 2BaO·3B<sub>2</sub>O<sub>3</sub>·6H<sub>2</sub>O 0.5, and Ba(ClO<sub>4</sub>)<sub>2</sub> 0.2 part were roll kneaded and pressed into a 1-mm sheet, which showed heat stability 120 min (190.degree.), vs. 60 for a sheet without Ba(ClO<sub>4</sub>)<sub>2</sub>. A urethane foam-backed sheet from the PVC sheet showed very slight discoloration after 400 h at 110.degree., and slight discoloration after 600 h in a fade meter at 83.degree..

IT 137456-50-9, Aluminum potassium borate oxide (Al<sub>2</sub>K(BO<sub>2</sub>)<sub>3</sub>O<sub>2</sub>)

RL: USES (Uses)

(thermal discoloration preventers and light stabilizers contg., for chlorine-contg. resins)

L9 ANSWER 20 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1984:13283 HCAPLUS

DN 100:13283

TI X-ray diffraction study of the potassium oxide-aluminum oxide-boron oxide system

AU Kozhina, I. I.; Kornilova, E. E.; Petrovskii, G. T.; Stepanov, S. A.

CS USSR

SO Vestnik Leningradskogo Universiteta, Seriya 4: Fizika, Khimiya (1983), (3), 40-6

CODEN: VLUFBI; ISSN: 0024-0826

DT Journal

LA Russian

AB The system K<sub>2</sub>O-Al<sub>2</sub>O<sub>3</sub>-B<sub>2</sub>O<sub>3</sub> was studied by x-ray diffraction. The glass region was defined. The system has a wide range of solid solns. The formation of 3 ternary compds. was established: K<sub>2</sub>Al<sub>2</sub>B<sub>2</sub>O<sub>7</sub>, K<sub>2</sub>Al<sub>2</sub>B<sub>3</sub>O<sub>10</sub>, and a phase of unknown compn.

IT 88160-55-8 88160-56-9

RL: PRP (Properties)

(in ternary systems)

L9 ANSWER 21 OF 21 HCAPLUS COPYRIGHT 2003 ACS

AN 1983:21013 HCAPLUS

DN 98:21013

TI The crystal structure of tripotassium aluminate octaborate, K<sub>3</sub>AlB<sub>8</sub>O<sub>15</sub>

AU Tanaka, Yoshinori; Fukunaga, Jiro; Setoguchi, Masahiro; Higashi, Tuneyuki; Ihara, Masayoshi

CS Dep. Inorg. Mater., Kyoto Inst. Technol., Kyoto, 606, Japan

SO Yogyo Kyokaishi (1982), 90(8), 458-63

CODEN: YGKSA4; ISSN: 0372-7718

DT Journal

LA Japanese

AB A new cryst. compd. was found in the glass-forming region of the

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K2O-Al2O3-B2O3 system. Electron probe microanal. and chem. analyzes indicated that this crystal is K3AlB8O15. Single crystals 1 to req. 0.1 mm were grown by slow cooling from a stoichiometric melt in a Pt crucible. Unit cell dimensions and std. errors were  $a = 10.107 \pm 0.005$ ,  $b = 11.485 \pm 0.005$ , and  $c = 12.760 \pm 0.005$  ANG., and  $\beta = 91.54 \pm 0.02$  degree.. The obsd. and the calcd. densities were 2.10 and 2.11 g/cm<sup>3</sup>, resp. The formula units in the cell was  $Z = 4$ . The structure refined to R values of 0.050 and 0.051 for space groups P<sub>c</sub> and P21/c, resp. As very similar structures were obtained, the space group P21/c was used for a description of the structure. The av. B-O bond lengths for the BO<sub>4</sub> tetrahedra and the BO<sub>3</sub> triangles are 1.474 and 1.364 ANG., resp.

IT 84067-38-9

RL: PRP (Properties)  
(crystal structure of)

03/13/2003

L13 ANSWER 1 OF 43 HCAPLUS COPYRIGHT 2003 ACS  
AN 2003:133761 HCAPLUS  
TI Harmonic **laser**  
IN Yin, Yusong  
PA Photonics Industries International. Inc., USA  
SO U.S. Pat. Appl. Publ., 12 pp.  
CODEN: USXXCO  
DT Patent  
LA English  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
	-----	-----	-----	-----	-----
PI	US 2003035448	A1	20030220	US 2000-741137	20001219
PRAI	US 2000-741137		20001219		

AB Harmonic **lasers** are provided. A 3rd harmonic **laser** includes a 1st high reflector and an output coupler forming a resonator cavity having an optical axis. The resonator cavity includes a **laser** medium for producing a fundamental beam. Desirably, the **laser** medium is Nd:YAG, Nd:YLF, Nd:YVO<sub>4</sub>, although other **laser** media are also contemplated such as Ti:sapphire, Nd:YAB and the like. The **laser** medium can be pumped by any desired source for example **laser**, **laser** diode, **laser** diode bar, fiber coupled **laser** diode bar or lamp which are known in the art. The **laser** medium can be either end pumped or side pumped which are also known. The 1st high reflector is reflective of a fundamental beam. A 2nd harmonic generator is located within the cavity formed between the 1st high reflector and the output coupler for generating a 2nd harmonic beam from the fundamental beam. The output coupler is highly transmissive for 2nd harmonic beam and partially transmissive for a fundamental beam. The fundamental beam and the 2nd harmonic beam exit the output coupler before incidenting on a harmonic generator. The 3rd harmonic generator is positioned external to the resonator cavity and is located along the optical path from the output coupler so that the fundamental and the 2nd harmonic beams incident on the 3rd harmonic generator where portions of the 2nd and the fundamental are converted to 3rd harmonic beam.

L13 ANSWER 2 OF 43 HCAPLUS COPYRIGHT 2003 ACS  
AN 2002:644095 HCAPLUS  
DN 137:356665  
TI The optical and 57Fe Mossbauer spectra of lithium diborate (Li<sub>2</sub>B<sub>4</sub>O<sub>7</sub>) in borophosphate glass-ceramics  
AU Almeida, A. F. L.; Vasconcelos, I. F.; Valente, M. A.; Sombra, A. S. B.  
CS Departamento de Quimica Organica e Inorganica, UFC, Centro de Ciencias, Ceara, Brazil  
SO Physica B: Condensed Matter (Amsterdam, Netherlands) (2002), 322(3-4), 276-288  
CODEN: PHYBE3; ISSN: 0921-4526  
PB Elsevier Science B.V.  
DT Journal  
LA English  
AB Lithium borophosphate glasses and glass-ceramics in the system 66.6|xB2O3.cntdot.(100-x)P2O5|. 33.3Li<sub>2</sub>O:yFe<sub>2</sub>O<sub>3</sub> with 0.1toreq.x.1toreq.100 mol% and y=4 mol%, were studied by X-ray powder diffraction, 57Fe Mossbauer and IR spectroscopy. All the samples in the system present a glass or glass-ceramics behavior which is confirmed by X-ray diffraction. The substitution of P<sup>5+</sup> by B<sup>3+</sup> assocd. with the increase of the B<sub>2</sub>O<sub>3</sub>/P<sub>2</sub>O<sub>5</sub> ratio leads to oxidn. of the iron in the samples which was detected by Mossbauer spectroscopy. From our Mossbauer anal., high-spin Fe<sup>2+</sup> and Fe<sup>3+</sup> in a distorted octahedral coordination are present in all samples. For

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heat-treated samples we have the pptn. of **cryst.** phase of Li<sub>2</sub>B<sub>4</sub>O<sub>7</sub> and for others lithium borate phases which was confirmed by X-ray powder diffraction. The Mossbauer spectra for some heat-treated samples show, besides the paramagnetic doublets, a magnetic sextet component with hyperfine magnetic field (Bhf=50 T). These magnetic phases were not identified up to this point in our study but we believe that these parameters are quite close to Hematite (.alpha.-Fe<sub>2</sub>O<sub>3</sub>). The **boric acid** phase H<sub>3</sub>BO<sub>3</sub> were also identified by the X-ray diffraction, and IR spectroscopy for x=26.6, 40 and 53.3 mol%. Such glasses and glass-ceramics contg. **nonlinear** optical materials formed in a controlled **crystn.** process would be interesting candidates for application in new electro-optic devices.

RE.CNT 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 3 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2002:284149 HCPLUS  
DN 136:344347  
TI Fabrication of .beta.-BaB<sub>2</sub>O<sub>4</sub> thin films with (001) preferred orientation through the chemical solution deposition technique  
AU Kobayashi, Takeshi; Ogawa, Ryo; Miyazawa, Kun'ichi; Kuwabara, Makoto  
CS Department of Materials Science, University of Tokyo, Tokyo, 113-8656, Japan  
SO Journal of Materials Research (2002), 17(4), 844-851  
CODEN: JMREEE; ISSN: 0884-2914  
PB Materials Research Society  
DT Journal  
LA English  
AB .beta.-BaB<sub>2</sub>O<sub>4</sub> (.beta.-BBO) films with the (001) preferred orientation were successfully fabricated on Si(100) and fused quartz substrates by the chem. soln. deposition technique. The films were characterized by x-ray diffractometry in out-of-plane and in-plane geometry, reciprocal space mapping, TEM and SEM. The degree of orientation of the films is as high as 95% and the full width at half-max. (FWHM) of the rocking curve for the films is as low as 2.9.degree.. The films have a mosaic structure. The (001) planes of some of the **crystallites** tilt to the substrate and the in-plane orientation of each **crystallite** is random. The size of each **crystallite** is 0.5-1.5 .mu.m, and **crystallite** thickness is equal to the film thickness. The degree of orientation of the films increases and the FWHM of rocking curve for the films decreases with increasing film thickness. The thicker the films are, the larger the **crystallite** size and the more definite the **crystallite** boundaries are. These phenomena are thought to be closely related with the increase in internal stress with film thickness. The films irradiated by Nd<sup>3+</sup>:YAG **laser** light generated second harmonic wave.

RE.CNT 24 THERE ARE 24 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 4 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2002:19282 HCPLUS  
DN 136:158501  
TI Atom interferometry with Mg beams  
AU Bagayev, S. N.; Baraulia, V. I.; Bonert, A. E.; Goncharov, A. N.; Seydaliev, M. R.; Tychkov, A. S.  
CS Institute of Laser Physics, Siberian Division, Russian Academy of Sciences, Novosibirsk, 630090, Russia  
SO Laser Physics (2001), 11(11), 1178-1186  
CODEN: LAPHEJ; ISSN: 1054-660X  
PB MAIK Nauka/Interperiodica Publishing  
DT Journal

03/13/2003

LA English  
AB The authors developed the **laser** system at 457 nm based on continuous-wave ring Ti:Sap **laser** and enhanced cavity SHG in LBO and KN **crystals** with linewidth <30 kHz for interferometry expts. with Mg at. beam. For **laser** cooling and deflection of Mg beam the **laser** system at 285 nm based on ring R6G continuous-wave dye **laser** and SHG in BBO **nonlinear crystal** was realized. The results of Mg interferometry expts. in 4-beam Borde geometry are presented as well as the results of Zeeman cooling expts. in transverse magnetic field. The zero order interference fringes correspondent to the recoil doublet were detected with the resoln. of .apprx.30 kHz. The Mg beam with the flux of .apprx.1011 atoms/s, the mean velocity of .apprx.200 m/s and the width of velocity distribution of .apprx.50 m/s (FWHM) was produced.

RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 5 OF 43 HCAPLUS COPYRIGHT 2003 ACS  
AN 2001:853788 HCAPLUS  
DN 136:126078  
TI Generation of tunable **laser** radiation in ultraviolet and near-infrared regions for various applications  
AU Bhar, Gopal H.; Chatterjee, Udit  
CS Physics Department, Laser Lab, Burdwan University, Burdwan, 713104, India  
SO Proceedings of SPIE-The International Society for Optical Engineering (2001), 4417(Photonics 2000), 54-58  
CODEN: PSISDG; ISSN: 0277-786X  
PB SPIE-The International Society for Optical Engineering  
DT Journal  
LA English  
AB Generation of wide tunable **laser** radiation from 188 nm in UV til 7.7 .mu.m in IR is reported in lab. using a single com. available Nd:YAG **laser** as basic pump. Techniques employed are sum-frequency mixing and harmonic generation for the UV while for the IR the authors employ difference-frequency mixing. The **nonlinear crystal** used include BBO, LBO, CLBO, LB4, KTP, RTP, KTA and LiIO3. A max. conversion efficiency over 20% is realized for both in UV and IR generation. The authors have obtained some spectra of DNA, RDX in the UV while those of polystyrene film and Methane gas in the IR with the generated radiation.

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 6 OF 43 HCAPLUS COPYRIGHT 2003 ACS  
AN 2001:744676 HCAPLUS  
DN 135:295953  
TI **Laser** light generating apparatus  
IN Kaneda, Yushi  
PA Sony Corp., Japan  
SO U.S., 13 pp.  
CODEN: USXXAM  
DT Patent  
LA English  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6301276	B1	20011009	US 1996-588007	19960117
	JP 08194240	A2	19960730	JP 1995-5425	19950118

PRAI JP 1995-5425 A 19950118

AB A **laser** light generating app. capable of radiating a **laser** light of 3rd harmonics of the fundamental light as a

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continuous light, is disclosed. The app. includes a 1st **laser** light source employing an Nd:YAG **laser** as a **laser** medium as a **laser** light source radiating the continuous **laser** light of an IR wavelength, a 2nd **laser** light source for resonating a **laser** light from a **laser** medium of Nd:YVO<sub>4</sub> within a resonator for generating 2nd harmonics, as a **laser** light source radiating a continuous **laser** light of a green wavelength, and an external resonator consisting of a set of mirrors. The outgoing lights are combined by additive frequency mixing by a phase-matched **nonlinear crystal** element BBO arranged within the external resonator as the outgoing lights are synchronized and resonated simultaneously within the external resonator.

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 7 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2001:742577 HCPLUS  
DN 136:92987  
TI An injection seeded narrow bandwidth pulsed optical parametric oscillator and its application to the investigation of hyperfine structure in the PF radical  
AU Fitzpatrick, James A. J.; Chekhlov, Oleg V.; Elks, John M. F.; Western, Colin M.; Ashworth, Stephen H.  
CS School of Chemistry, University of Bristol, Bristol, BS8 1TS, UK  
SO Journal of Chemical Physics (2001), 115(15), 6920-6930  
CODEN: JCPSA6; ISSN: 0021-9606  
PB American Institute of Physics  
DT Journal  
LA English  
AB The authors describe the construction of an all solid-state, narrow bandwidth, pulsed optical parametric oscillator (OPO) based on .beta.-Ba borate **nonlinear crystals**. The OPO was injection seeded by an external cavity diode **laser** in the range 755-855 nm to generate high power narrow bandwidth tunable light in this range and simultaneously at 606-669 nm. The bandwidth of the visible light was .apprx.130 MHz, and after frequency doubling or sum frequency mixing with the 2nd harmonic of the pump Nd:YAG **laser**, sub-Doppler spectra with an overall resoln. of 450 MHz were taken in the UV. The system is demonstrated by taking high-resoln. spectra of the v' = 2-3 and 5-7 bands of the A 3.PI.-X 3.SIGMA.- (v',0) progression and the v' = 4-v''=0 band of the d 1.PI.-a 1.DELTA. transition in PF. These spectra show clear hyperfine structure, and an anal. of this structure is presented and interpreted in terms of the electronic structure of the mol. As a prelude to this high-resoln. study, the 1st 10 members of the A-X band system and the 1st 5 members of the d-a band system were recorded at the moderate resoln. provided by a pulsed dye **laser**.

RE.CNT 40 THERE ARE 40 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 8 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2001:685192 HCPLUS  
DN 135:378900  
TI BBO **crystal** growth in static and rotating heat fields of variable symmetry  
AU Kokh, Alexandr E.; Kononova, Nadegda G.; Popov, Vladimir N.; Mokruchnikov, Paweł W.  
CS Institute of Mineralogy and Petrography, Novosibirsk, 630090, Russia  
SO Proceedings of SPIE-The International Society for Optical Engineering (2001), 4268(Growth, Fabrication, Devices, and Applications of Laser and Nonlinear Materials), 161-166  
CODEN: PSISDG; ISSN: 0277-786X

03/13/2003

PB SPIE-The International Society for Optical Engineering  
DT Journal  
LA English  
AB BBO **crystals** (.beta. -BaB<sub>2</sub>O<sub>4</sub>) exhibit unique **nonlinear**  
- and electrooptical properties, which provide their wide application in  
laser techniques. The growth of BBO is a technol. sophisticated  
procedure enabling the prodn. of big high-quality single **crystals**  
. The growth of BBO **crystals** was performed with high-temp.  
melt-soln. **crystn.** method, most commonly in the BaO-B<sub>2</sub>O<sub>3</sub>- Na<sub>2</sub>O  
ternary system. The typical effect of constitutional supercooling results  
from a high viscosity of the melt- soln. and the fact that a growing BBO  
**crystal** shields the **crystg.** melt, thus removing heat  
away from **crystn.** interface. The contribution considers the  
possibility of the improvement of **crystal** growth process via the  
change of heat field symmetry and its rotation. The symmetry of a static  
heat field reducing from Lvaries direct as to L<sub>3</sub> results in stronger  
convection and, therefore, larger **crystal**. On the other side  
the permanent symmetry of a heat field -- static or rotating -- commonly  
provokes the formation of a quite big defect area in the central part of a  
grown boule with the signs of cell growth. To improve the convection in  
the central sub-**crystal** area the authors performed the BBO  
**crystal** growth process in a rotating heat field, which is free of  
the symmetry axis coinciding with the symmetry axis of the growth  
furnace/crucible. The expts. showed that the **crystal** with a  
defect-free central area can be successfully produced.

RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 9 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2001:594665 HCPLUS  
DN 135:280084  
TI Tunable high power picosecond **laser** in ultra-violet  
AU Wang, Li; Huang, Liu  
CS Physics Department, Hebei Normal University, Shijiazhuang, Peop. Rep.  
China  
SO Zhongguo Jiguang (2001), A28(6), 491-493  
CODEN: ZHJIDO; ISSN: 0258-7025  
PB Kexue Chubanshe  
DT Journal  
LA Chinese  
AB Using SHG tunable feature of **nonlinear crystal** BBO, an  
expt. of UV tunable **laser** in 200-350 nm with conversion  
efficiency from 15.3% to 23.6% was demonstrated. The influence of the  
divergence angle and the linewidth of the incident parametric light on the  
SHG conversion is calcd. and compared with the expts.

L13 ANSWER 10 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2001:366975 HCPLUS  
DN 135:128833  
TI Overview of violet and deep-UV **nonlinear** optical  
**crystals** in the last decade  
AU Chen, Chuang-tian  
CS Beijing Center for Crystal R & D, Institute of Physics and Chemistry  
Technology, Chinese Academy of Sciences, Beijing, 100080, Peop. Rep. China  
SO Rengong Jingti Xuebao (2001), 30(1), 36-42  
CODEN: RJXUEN; ISSN: 1000-985X  
PB Rengong Jingti Xuebaoshe  
DT Journal; General Review  
LA Chinese  
AB A review with 13 refs. The studies on violet and deep-UV  
**nonlinear** optical **crystals** over the last decade,

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including successes and failures, are discussed. Successes include the discovery of KBBF **crystal** which produces the shortest 2nd harmonic output (184.7 nm), and KABO **crystal** which was grown to cm size and is a promising candidate for the 4th and 5th harmonic generation of Nd:YAG **laser** light. The SBB0 **crystal** which has good linear and **nonlinear** properties lacks structural-completeness. The **crystal** cannot be used yet.

L13 ANSWER 11 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2000:750925 HCPLUS  
DN 134:154847  
TI Miniature diode-pumped Nd:YAG **laser** emitting in the blue  
AU Batai, L. E.; Kuz'min, A. N.; Ryabtsev, G. I.; Demidovich, A. A.  
CS B. I. Stepanov Institute of Physics, National Academy of Sciences of Belarus, Minsk, Belarus  
SO Journal of Optical Technology (Translation of Opticheskii Zhurnal) (2000), 67(11), 971-972  
CODEN: JOTEE4; ISSN: 1070-9762  
PB Optical Society of America  
DT Journal  
LA English  
AB A solid-state Nd:YAG **laser** with diode pumping and intracavity frequency doubling on a **nonlinear** BBO **crystal** was created, and its optical characteristics were studied. The max. radiation power at a wavelength of 473 nm in the continuous-wave regime, obtained exptl., was 15 mW when the diode-pump power was 1.17 W. The differential efficiency of pump-energy conversion to the 2nd harmonic reached 2.5% in this case.

RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 12 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2000:750920 HCPLUS  
DN 134:154937  
TI Radiation strength of dielectric coatings in the SiO<sub>2</sub>.+-..delta.-.beta.-BaB<sub>2</sub>O<sub>4</sub> system  
AU Guretskii, S. A.; Kalanda, N. A.; Kolesova, I. M.; Korzun, B. V.; Kravtsov, A. V.; Luginets, A. M.; Novitskii, N. N.; Stognii, A. I.; Zaporozhchenko, Yu. V.  
CS Institute of Solid-State and Semiconductor Physics, National Academy of Sciences of Belarus, Minsk, Belarus  
SO Journal of Optical Technology (Translation of Opticheskii Zhurnal) (2000), 67(11), 947-950  
CODEN: JOTEE4; ISSN: 1070-9762  
PB Optical Society of America  
DT Journal  
LA English  
AB This paper discusses questions of the fabrication of dielec. coatings on **nonlinear** optical BBO **crystals**. The effect of sputtering methods and subsequent gas and heat treatment on the mech. and radiation strength of SiO<sub>2</sub>.+-..delta.-based dielec. coatings is studied. The dependence of the **laser**-damage thresholds of the coatings on their nonstoichiometry with respect to O is analyzed.

L13 ANSWER 13 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2000:540094 HCPLUS  
DN 133:127843  
TI R2MB10019 **nonlinear** optical **crystal** and its preparation and application  
IN Wu, Yicheng; Liu, Jianguo; Fu, Peizhen; Wang, Junxin; Zhao, Guiwen  
PA China University of Science and Technology, Peop. Rep. China

03/13/2003

SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 11 pp.  
CODEN: CNXXEV

DT Patent  
LA Chinese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1236027	A	19991124	CN 1998-108570	19980514
	CN 1084399	B	20020508		
	US 6146553	A	20001114	US 1999-301092	19990428
PRAI	CN 1998-108570	A	19980514		

AB A **nonlinear optical crystal** has a chem. formula of R2MB10O19, wherein R is selected from rare earth and Y, and M is Ca, Sr, or Ba. The optical **crystal** is prep'd. from R-contg. compd., M-contg. compd., and B-contg. compd. by melt method. The M-contg. and R-contg. compds. are the oxide, chloride, carbonate, nitrate, oxalate, or borate of R and M; the B- contg. compd. is H3BO3 or B2O3. The compd. can be used to manuf. **nonlinear optical devices or laser nonlinear optical devices.**

L13 ANSWER 14 OF 43 HCAPLUS COPYRIGHT 2003 ACS

AN 2000:432870 HCAPLUS

DN 133:141808

TI High-intensity pulsed source of space-time and polarization double-entangled photon pairs

AU Kim, Yoon-Ho; Kulik, Sergei P.; Shih, Yanhua

CS Department of Physics, University of Maryland, Baltimore County, Baltimore, MD, 21250, USA

SO Physical Review A: Atomic, Molecular, and Optical Physics (2000), 62(1), 011802/1-011802/4

CODEN: PLRAAN; ISSN: 1050-2947

PB American Physical Society

DT Journal

LA English

AB Two spatially sepd. type-I **nonlinear crystals** are pumped by femtosecond **laser** pulses to create entangled photon pairs in the process of spontaneous parametric down-conversion. The 2-photon entangled state exhibits high-visibility quantum interference for both polarization and space-time variables without the need of stringent spectral post-selection by using narrow-band filters. The visibility is insensitive to the thickness of the **crystals**, unlike in the case of pulse pumped type-II parametric down-conversion; therefore the intensity can be easily increased by using thick **nonlinear crystals**. This method will be indispensable in expts. that require a pulsed source of entangled photon pairs, such as generation of multiphoton entangled states, quantum teleportation, and quantum communications.

RE.CNT 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 15 OF 43 HCAPLUS COPYRIGHT 2003 ACS

AN 2000:333968 HCAPLUS

DN 133:50676

TI Two-photon absorption inside beta-BBO **crystal** during UV **nonlinear** optical conversion

AU Wu, Sheng; Blake, Geoffrey A.; Sun, Sunny; Yu, Henry

CS Div. Geol. Planet. Sci., California Institute of Technology, CA, USA

SO Proceedings of SPIE-The International Society for Optical Engineering (2000), 3928(Nonlinear Materials, Devices, and Applications), 221-227

CODEN: PSISDG; ISSN: 0277-786X

PB SPIE-The International Society for Optical Engineering

03/13/2003

DT Journal  
LA English

AB The authors measured the 2-photon absorption (TPA) cross sections inside  $\beta$ -BBO **crystal** during UV harmonic generation. The 2-photon absorption is dominating the absorption effect inside the BBO **crystal** during UV harmonic generation. Both 2 UV photons and 1 UV photon + 1 fundamental photon absorption cross sections are significant. Possible explanations are presented, and compared with other **nonlinear** optical **crystals**. Thermal profiles inside the **crystal** as a result of the strong absorption processes are discussed through a computer program that simulates the heat dissipation process. TPA is the significant factor in high power scaling of UV harmonic generation inside **nonlinear** optical **crystals**.

RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 16 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2000:321370 HCPLUS  
DN 133:10256  
TI Overview of the **laser** and **non-linear** optical properties of calcium-gadolinium-oxo-borate  $\text{Ca}_4\text{GdO}(\text{BO}_3)_3$   
AU Aka, G.; Mougel, F.; Auge, F.; Kahn-Harari, A.; Vivien, D.; Benitez, J. M.; Salin, F.; Pelenc, D.; Balembois, F.; Georges, P.; Brun, A.; Le Nain, N.; Jacquet, M.  
CS Laboratoire de Chimie Appliquee de l'Etat Solide, ENSCP, Paris, 75231, Fr.  
SO Journal of Alloys and Compounds (2000), 303-304, 401-408  
CODEN: JALCEU; ISSN: 0925-8388  
PB Elsevier Science S.A.  
DT Journal; General Review  
LA English  
AB A review with 23 refs.  $\text{Ca}_4\text{GdO}(\text{BO}_3)_3$  (GdCOB) is a new **nonlinear** optical (NLO) material which presents a congruent melting and can be grown from the melt in large size **crystals** ( $\phi = 50$  mm,  $L = 120$  mm) using the Czochralski pulling method. This paper describes the **crystal** growth and NLO properties of GdCOB which compare favorably with those of com. borates like BBO or LBO. Particular emphasis will be put on SHG of the Nd:YAG 1.064  $\mu\text{m}$  **laser** emission. Large amounts of Nd or Yb ions can be substituted for Gd in this material and Ln:GdCOB with Ln = Nd, Yb exhibits interesting **laser** properties, esp. in the case of diode pumped Yb activated **crystals**. Finally by combining the NLO properties of the GdCOB matrix and the **laser** emission assocd. with the active ion, a green self frequency-doubling **laser** is obtained. In this field, Nd:GdCOB appears the most promising material for practical applications, able to generate visible green **laser** light with only one single **crystal** instead of 2, as usually. To date an Nd:GdCOB **crystal** yields 114 mW at 530.5 nm (for 1250 mW of absorbed pump power), when pumped with a 2 W high brightness **laser** diode.

RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 17 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 2000:252293 HCPLUS  
DN 132:257946  
TI **Nonlinear** optical **crystal** aluminum barium oxyborate  
IN Ye, Ning; Zeng, Wenrong; Chen, Chuangtian; Wu, Baichang; Wu, Yicheng  
PA Fujian Research Institute of Material Structure, Chinese Academy of Sciences, Peop. Rep. China  
SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 11 pp.  
CODEN: CNXXEV  
DT Patent

03/13/2003

LA Chinese

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1215767	A	19990505	CN 1997-120924	19971028
	CN 1075845	B	20011205		
PRAI	CN 1997-120924		19971028		

AB The **nonlinear** optical **crystal** (BaAl<sub>2</sub>O(BO<sub>3</sub>)<sub>2</sub>) belongs to space group R32(D37); the lattice parameters  $a = 5.001 \text{ \AA}$ ,  $c = 24.378 \text{ \AA}$ ,  $z = 3$ ; the cell vol.  $V = 527.78 (\text{ \AA})^3$ . BaAl<sub>2</sub>O(BO<sub>3</sub>)<sub>2</sub> is synthesized from BaCO<sub>3</sub>, Al(OH)<sub>3</sub>, and H<sub>3</sub>BO<sub>3</sub> by sintering. The **crystal** is prep'd. by molten-salt method using flux B<sub>2</sub>O<sub>3</sub>, PbF<sub>2</sub>, NaF, LiF, etc.; the melt is a mixt. of BaAl<sub>2</sub>O(BO<sub>3</sub>)<sub>2</sub>, B<sub>2</sub>O<sub>3</sub>, and PbF<sub>2</sub> at a ratio of 3 : (0.5-1.2) : (0.8-1.5); the **crystal** growth parameters are: **crystal** growth temp. 960.degree..fwdarw. 850.degree., cooling rate 1-3.degree./day, and **crystal** rotary speed 10-20 rpm. The **nonlinear** optical **crystal** can be used for frequency multiplication of radiation from Nd:YAG **laser**, etc.

L13 ANSWER 18 OF 43 HCAPLUS COPYRIGHT 2003 ACS

AN 2000:230616 HCAPLUS

DN 132:229629

TI **Nonlinear** optical BBO **crystals**: growth, properties and applications

AU Tang, Ding-Yuan

CS Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, 350002, Peop. Rep. China

SO Jiegou Huaxue (2000), 19(2), 112-121

CODEN: JHUADF; ISSN: 0254-5861

PB Jiegou Huaxue Bianji Weiyuanhui

DT Journal; General Review

LA English

AB A review with 31 refs. Low temp. phase Ba metaborate .beta.-BaB<sub>2</sub>O<sub>4</sub> (BBO) is an important **nonlinear** optical material. The BBO single **crystals** with large size and good optical quality were grown from Na<sub>2</sub>O or NaF fluxed solvents by the top-seeded soln. growth (TSSG) technique with or without pulling. To improve the growth rate and quality of BBO **crystals**, several new techniques such as continuous feeding, forced stirring and cooling growing **crystals** etc. were suggested. Applications of BBO as an excellent **nonlinear** optical **crystal** include mainly frequency conversion of various **laser** radiation, high av. power frequency conversion, frequency doubling of ultrashort pulses and broadly tunable optical parametric oscillators (OPO). This paper is a brief review on the growth, properties and applications of BBO **crystals**.

RE.CNT 32 THERE ARE 32 CITED REFERENCES AVAILABLE FOR THIS RECORD

ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 19 OF 43 HCAPLUS COPYRIGHT 2003 ACS

AN 2000:6864 HCAPLUS

DN 132:114838

TI Generation of tunable ultraviolet sources in a quasi-cw Ti: sapphire **laser**

AU Yu, Tian-yan; Yu, Bing-kun; Wang, Qi; Huang, Feng; Dong, Jing-xing; Lou, Qi-hong

CS School of Sciences, Shanghai University, Shanghai, 201800, Peop. Rep. China

SO Shanghai Daxue Xuebao, Ziran Kexueban (1999), 5(5), 377-380

CODEN: SDXKFV; ISSN: 1007-2861

PB Shanghai Daxue

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DT Journal  
LA Chinese  
AB Efficient frequency doubling was realized by using 2 BBO **nonlinear crystals** with a quasi-continuous-wave tunable Ti:sapphire laser whose repetition rate is 10 kHz. Tunable UV and visible light within the range of 360-476 nm is obtained. Third harmonic radiation ranging from 240-260 nm also was obtained by frequency tripling.

L13 ANSWER 20 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1999:449753 HCPLUS  
DN 131:235295  
TI Optical logic gates by **nonlinear** mixing in BBO  
AU Moser, Christophe; Psaltis, Demetri  
CS California Institute of Technology, Pasadena, CA, USA  
SO Proceedings of SPIE-The International Society for Optical Engineering (1999), 3609(Optical Pulse and Beam Propagation), 173-180  
CODEN: PSISDG; ISSN: 0277-786X  
PB SPIE-The International Society for Optical Engineering  
DT Journal  
LA English  
AB An exptl. demonstration of a set of optical logic gates (OR, XOR, AND) is shown using **nonlinear** mixing in a BBO **crystal**. Pulses generated by a femtosecond Ti:Sapphire **laser** at 800 nm are split in 4 beams evenly sep'd. in space and propagating collinearly. The 4 beams are focused by a singlet lens in the **nonlinear crystal** and frequency doubled using a type I noncollinear phase matching. Due to spherical aberrations of the lens, the 2 beams that are far from the optical axis are brought into a focus that is slightly further away from the focus formed by the 2 beams closer to the optical axis. The frequency-doubled light generated by the 2 foci propagates in the same direction. An OR gate is produced by constructive interference of the frequency doubled pulses. A XOR gate is produced using destructive interference. OR and XOR can be programmed form a single gate by adjusting time delays of the inputs. The authors raise the possibility of creating a cascaded set of gates for a femtosecond time scale computing system using photoinduced absorption in polyacetylene substitutes.

RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 21 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1999:375825 HCPLUS  
DN 131:206623  
TI Growth and investigation of BBO **crystals** with improved characteristics for UV harmonic generation  
AU Kokh, Alexandr E.; Mishchenko, Valentin; Antsigin, Valery D.; Yurkin, Alexander M.; Kononova, Nadezhda G.; Guets, Victor A.; Nizienko, Yury K.; Zakharchenko, Alexandr I.  
CS Institute of Mineralogy and Petrography, Novosibirsk, Russia  
SO Proceedings of SPIE-The International Society for Optical Engineering (1999), 3610(Laser Material Crystal Growth and Nonlinear Materials and Devices), 139-147  
CODEN: PSISDG; ISSN: 0277-786X  
PB SPIE-The International Society for Optical Engineering  
DT Journal  
LA English  
AB BBO **crystals** were grown by the top-seeded soln. growth technique from a Na<sub>2</sub>O melt-soln. Optimization of heating conditions and technol. growth parameters allowed one to produce high-quality **optic crystals**. Their main morphol. feature is the facing of a boule side surface. The area of hexagonal prism face {1120} can reach several square centimeters. **Nonlinear-optical** elements which are

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produced from a **crystal** with well arranged faces have higher coeffs. of **laser** radiation frequency conversion. The BBO **crystals** were studied for linear and **nonlinear** absorption. Linear absorption was measured with conventional spectroscopic method. The anal. of supplementary absorption spectra and thermally-stimulated **luminescence** behavior allowed one to suggest that Na atoms are a main spontaneous impurity in BBO **crystals** providing supplementary absorption in UV-region. The authors used the 4th and 5th harmonics of Nd-YAG **laser** to measure the **nonlinear** absorption. The selected optimized **crystals** were used in various optical schemes up to the 5th harmonic generation. Harmonic generation was studied by high performance original Nd-YAG **laser** (SLM-operation, D. L. output beam up to 100 Hz repetition rate, 1.8 ns pulse duration, 16 W output). Harmonic efficiency values are listed below. Several optical schemes for harmonic generation are discussed.

RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 22 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1998:702957 HCPLUS  
DN 130:58721  
TI Increased spectral bandwidths in **nonlinear** conversion processes by use of multicrystal designs  
AU Brown, Margaret  
CS Aculight Corporation, Bothell, WA, 98011, USA  
SO Optics Letters (1998), 23(20), 1591-1593  
CODEN: OPLEDP; ISSN: 0146-9592  
PB Optical Society of America  
DT Journal  
LA English  
AB The 4th-harmonic generation of broadband 243-nm radiation is reported. The broadband radiation is achieved by implementation of a multicrystal design to overcome spectral bandwidth limitations, and a plane-wave anal. is developed that shows increased spectral bandwidths for these designs. The 4th harmonic of a Cr:LiSAF **laser** operating at 972 nm is generated in beta-Ba borate (BBO). The results demonstrate a spectral bandwidth at 243 nm >5 times broader than that which is expected from a single BBO **crystal** of equiv. length.

RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 23 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1998:412859 HCPLUS  
DN 129:195374  
TI A compact, robust, instantaneously tunable harmonic generator for lidar applications  
AU Trebino, Rick; Richman, Bruce; Bisson, Scott E.; Mitchell, Mark; Delong, Kenneth W.; Sidick, Erkin; Jacobson, Alexander  
CS Sandia National Laboratories, Livermore, CA, 94551-0969, USA  
SO Advances in Atmospheric Remote Sensing with Lidar, Selected Papers of the International Laser Radar Conference, 18th, Berlin, July 22-26, 1996 (1997), Meeting Date 1996, 447-450. Editor(s): Ansmann, Albert. Publisher: Springer, Berlin, Germany.  
CODEN: 66IJAF  
DT Conference  
LA English  
AB The authors describe a novel method of 2nd harmonic generation (achromatic phase matching) that is instantaneously tunable over a broad spectral range and that is entirely passive; there are no moving elements. The technique borrows from the field of ultra-short pulse technol. where

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broadband pulses need to be frequency doubled while preserving pulse width. Designs are aimed at efficient 2nd harmonic generation of tunable radiation where the effects of group velocity dispersion may be ignored. Dispersive elements, such as prisms and gratings, are used to match the tuning rate of the **nonlinear crystal**. The authors present 2 designs: 1 based entirely on prisms and 1 based on a combination of both prisms and gratings.

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 24 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1998:370475 HCPLUS  
DN 129:115167  
TI Highly efficient, widely tunable, 10-Hz parametric amplifier pumped by frequency-doubled femtosecond Ti:sapphire **laser** pulses  
AU Zhang, Jin-Yuan; Xu, Zuyan; Kong, Yufei; Yu, Chaowen; Wu, Yicheng  
CS Department of Physics, Georgia Southern University, Statesboro, GA, 30460-8031, USA  
SO Applied Optics (1998), 37(15), 3299-3305  
CODEN: APOPAI; ISSN: 0003-6935  
PB Optical Society of America  
DT Journal  
LA English  
AB The authors report a 10-Hz, highly efficient, widely tunable (from the visible to the IR), broadband femtosecond optical parametric generator and optical parametric amplifier (OPA) in BBO, LBO, and CBO **crystals** pumped by the frequency-doubled output of a regeneratively amplified Ti:sapphire **laser** at 400 nm. The output of the system is continuously tunable from 440 nm to 2.5 .mu.m with a max. overall efficiency of .apprx.25% at 670 nm and an optical conversion efficiency of >36% in the OPA stage. The effects of the seed beam energy, the type of the **crystal** and the **crystal** length, and the pumping energy of the output of the OPA, such as the optical efficiency, the bandwidth, the pulse duration, and the group velocity mismatch between the signal and the idler and between the seeder and the pump, are studied. The results provide useful information for optimization of the design of the system.

RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 25 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1998:370469 HCPLUS  
DN 129:128548  
TI Unstable Cr:LiSAF **laser** resonator with a variable reflectivity output coupler  
AU Pinto, Joseph F.; Esterowitz, Leon  
CS U.S. Naval Research Laboratory, Code 5641, Washington, DC, 20375, USA  
SO Applied Optics (1998), 37(15), 3272-3275  
CODEN: APOPAI; ISSN: 0003-6935  
PB Optical Society of America  
DT Journal  
LA English  
AB The performance of a flash-lamp-pumped Cr:LiSAF unstable **laser** resonator using a 4th-order super-Gaussian variable reflectivity mirror as an output coupler is described. The super-Gaussian mirror results in a smooth, flattop transverse beam profile in the near field that is advantageous for **nonlinear** frequency-conversion applications. Long-pulse and Q-switched operation of the Cr:LiSAF unstable **laser** resonator are described and compared with stable resonator operation. The authors obtained tunable UV radiation extending from 267 to 290 nm by frequency mixing the Q-switched Cr:LiSAF **laser** output with Li

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triborate and .beta.-Ba borate **nonlinear crystals**.  
RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 26 OF 43 HCAPLUS COPYRIGHT 2003 ACS  
AN 1998:64677 HCAPLUS  
DN 128:186172  
TI Efficient noncollinear parametric amplification of weak femtosecond pulses  
in the visible and near-infrared spectral range  
AU Krylov, V.; Ollikainen, O.; Gallus, J.; Wild, U.; Rebane, A.; Kalintsev,  
A.  
CS Physical Chemistry Laboratory, ETH-Zentrum, Swiss Federal Institute of  
Technology, Zurich, 8092, Switz.  
SO Optics Letters (1998), 23(2), 100-102  
CODEN: OPLEDP; ISSN: 0146-9592  
PB Optical Society of America  
DT Journal  
LA English  
AB The authors report measurement of efficient amplification of weak  
femtosecond supercontinuum seed pulses using a noncollinear optical  
parametric process in BBO **crystal** pumped with 150-fs pulses from  
a frequency-doubled regenerative-amplified Ti:sapphire **laser** at  
390 nm. The highest amplification factor, 108, was achieved for 3 .times.  
10-16 J energy seed pulses at wavelength of 560 nm.

L13 ANSWER 27 OF 43 HCAPLUS COPYRIGHT 2003 ACS  
AN 1998:44773 HCAPLUS  
DN 128:198322  
TI Second-harmonic generation from regeneratively amplified femtosecond  
**laser** pulses in BBO and LBO **crystals**  
AU Zhang, Jing-yuan; Huang, Jung Y.; Wang, H.; Wong, K. S.; Wong, G. K.  
CS Ladrum Box 8031, Georgia Southern University, Department of Physics,  
Statesboro, GA, 30460, USA  
SO Journal of the Optical Society of America B: Optical Physics (1998),  
15(1), 200-209  
CODEN: JOBPDE; ISSN: 0740-3224  
PB Optical Society of America  
DT Journal  
LA English  
AB The spectral and temporal characteristics and optical-conversion  
efficiency of .apprx.150-fs **laser** pulses at 400 nm generated by  
2nd-harmonic generation (SHG) of a regeneratively amplified mode-locked  
Ti:sapphire **laser** were studied both theor. and exptl. The  
theor. study was done by taking into account cubic **nonlinearity**,  
pulse walk-off, group-velocity dispersion, Kerr **nonlinearity**,  
quadratic broadening, frequency chirping of the fundamental pulse, and  
higher-order **nonlinear** mixing such as backconversion and optical  
parametric processing. The exptl. studies of the effects of  
**crystal** length and pumping intensity on the pulse duration, the  
spectrum, and the optical-conversion efficiency of the SHG were carried  
out in BBO and LBO **crystals** of various thicknesses and compared  
with the theory. In a nontransform-limited pulse, the most significant  
contribution to the temporal and spectral distortion of the .apprx.150-fs  
SHG pulses is mainly due to the chirping of the fundamental beam and  
self-phase modulation at high pumping intensity and long **crystal**  
length. The optimum **crystal** length and pumping intensity for  
obtaining a high optical-conversion efficiency and a pure spectrum in SHG  
are also calcd. and exptl. studied. A transform-limited fundamental pulse  
is essential to obtain a high conversion efficiency and to preserve the  
temporal profile of the 2nd-harmonic pulse. Also for a  
nontransform-limited .apprx.150-fs pulse, a 0.5-0.6-mm BBO **crystal**

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and a modest pumping intensity of .apprx.40 GW/cm<sup>2</sup> are the most suitable for SHG.

L13 ANSWER 28 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1998:21313 HCPLUS  
DN 128:134069  
TI Superbroadband **laser** for visible and UV spectral regions  
AU Zverev, Peter G.; Fedorov, Vladimir V.; Basiev, Tasoltan T.; Mirov, Sergey B.  
CS General Physics Institute, Moscow, 117942, Russia  
SO Proceedings of SPIE-The International Society for Optical Engineering (1997), 3176(Tunable Solid State Lasers), 200-205  
CODEN: PSISDG; ISSN: 0277-786X  
PB SPIE-The International Society for Optical Engineering  
DT Journal  
LA English  
AB The anal. of simultaneous 2nd and 4th harmonic generation of superbroadband LiF:F2- color center **laser** radiation in different **nonlinear crystals** is presented. The expts. showed high **laser** and harmonic conversion efficiencies. Simultaneous generation of continuous spectra in near IR (1080-1270 nm), visible (545-620 nm) and UV (270-310 nm) spectral regions, and multiline oscillation with high spectral resoln. .DELTA..nu. <5 cm<sup>-1</sup> were obtained.  
RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L13 ANSWER 29 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1997:786459 HCPLUS  
DN 128:8573  
TI Monolithic structure obtained by optical contact of **nonlinear crystals** in walk-off compensation  
PA Cristal Laser, Fr.  
SO Fr. Demande, 13 pp.  
CODEN: FRXXBL  
DT Patent  
LA French  
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2744248	A1	19970801	FR 1996-1197	19960129
	FR 2744248	B1	19990402		
PRAI	FR 1996-1197		19960129		

AB The invention concerns a monolithic structure obtained by optical contact and/or joining of 2-2n **nonlinear** materials, permitting walk-off compensation in eliminating efficiency losses due to residual facet reflections. It is constituted of 2-2n **nonlinear crystals** which are strictly identical and optically joined. The **crystals** undergo a rotation around the axis perpendicular to the direction of the beam propagation, and contained in the plane defined by the 2 Poynting vectors governing the walk-off. The device using the invention is particularly designed for extra- and intracavity second harmonic generation by weak intensity **lasers** with **nonlinear** materials exhibiting strong walk-off and also for optical parametric oscillators with **crystals** such as KTP, BBO, and KNbO<sub>3</sub>.

L13 ANSWER 30 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1997:349748 HCPLUS  
DN 127:101331  
TI Efficient femtosecond pulse generation at 264 nm  
AU Veitas, G.; Dubietis, A.; Valiulis, G.; Podenas, D.; Tamosauskas, G.

03/13/2003

CS Laser Research Center, Vilnius Univ., Vilnius, 2040, Lithuania  
SO Optics Communications (1997), 138(4,5,6), 333-336  
CODEN: OPCOB8; ISSN: 0030-4018  
PB Elsevier  
DT Journal  
LA English  
AB The authors have exptl. demonstrated the generation of a powerful femtosecond pulse at 264 nm, starting with a picosecond pulse from a Nd:glass **laser** and using a **nonlinearly** compressed 2nd-harmonic pulse. Fourth-harmonic pulses with durations between 130-370 fs were generated in KDP and BBO **crystals** of various lengths. The consistency of the numerical and group-velocity mismatch and 2-photon absorption are the main factors limiting the efficiency of the frequency quadrupling process with femtosecond pulses.

L13 ANSWER 31 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1996:576818 HCPLUS  
DN 125:288653  
TI Dual beam light-scattering-tomography (LST) for detection of functional defects in **nonlinear** optical **crystals**  
AU Ogawa, Tomoya; Kawai, Satoru; Tan, Qiguang; Nango, Nobuhito  
CS Department of Physics, Gakushuin University, Tokyo, 171, Japan  
SO Proceedings of SPIE-The International Society for Optical Engineering (1996), 2873(Polarization Analysis and Applications to Device Technology), 222-225  
CODEN: PSISDG; ISSN: 0277-786X  
PB SPIE-The International Society for Optical Engineering  
DT Journal  
LA English  
AB Optical **nonlinearity** is a very important and useful phenomenon for frequency up-conversion of **laser** beams and for heterodyne demodulation due to mixing of optical signals, which will be realized by high quality **crystals** with large conversion efficiency. Since 1 of the candidates is BBO (beta-BaB2O4) **crystals**, the light scattering from the **crystals** was detected by 2 vidicon systems under an IR **laser** beam scanning. Here, 1 of the systems is used for detection of the scattered IR rays due to defects and the other for the visible light, both of which will simultaneously acquire the scattered light intensities from the **crystal**.

L13 ANSWER 32 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1996:459768 HCPLUS  
DN 125:153785  
TI Cavity-dumped femtosecond Kerr-lens mode locking in a chromium-doped forsterite **laser**  
AU Slobodchikov, Eugene; Ma, Jangseok; Kamalov, Valev; Tominaga, Keisuke; Yoshihara, Keitaro  
CS Institute for Molecular Science, Okazaki, 444, Japan  
SO Optics Letters (1996), 21(5), 354-356  
CODEN: OPLEDP; ISSN: 0146-9592  
PB Optical Society of America  
DT Journal  
LA English  
AB The authors report the operation of a cavity-dumped self-mode-locked Cr-doped forsterite **laser** with pulse energies exceeding 30 nJ and pulse durations as short as 54 fs (FWHM) at 1260 nm. By frequency doubling in a .beta.-barium-borate **crystal**, pulse energies .1 to < 3 nJ and pulse durations as short as 49 fs (FWHM) at 630 nm were generated. The high stability and ultrashort pulse widths with a variable repetition rate in both the IR (1260 nm) and the red (630 nm) make this system an attractive light source for ultrafast spectroscopy.

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L13 ANSWER 33 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1996:442472 HCPLUS  
DN 125:126983  
TI Investigation of a second harmonic generation in BBO inside a cavity of a CW linear dye **laser** with different pumping  
AU Apolonsky, A.A.; Kobtsev, S.M.; Sorokin, N.I.  
CS Institute of Automation and Electrometry, Novosibirsk, Russia  
SO Proceedings of SPIE-The International Society for Optical Engineering (1996), 2800(Nonlinear Optical Interactions and Wave Dynamics), 142-147  
CODEN: PSISDG; ISSN: 0277-786X  
PB SPIE-The International Society for Optical Engineering  
DT Journal  
LA English  
AB Continuous linear **laser** on dyes Rhodamine 6G and DCM, operating in a mode of intracavity frequency doubling is exptl. studied. Efficiency of radiation transformation is detd. by a **nonlinear**  $\beta$ -BaB<sub>2</sub>O<sub>4</sub> **crystal** and Ar+ pump **lasers** of a wide power range with various cross distribution of radiation. Effective narrow-band ( $\Delta\lambda$  apprx. 0.01-0.1 cm<sup>-1</sup>) generation in the field of 285-315 nm and broadband ( $\Delta\lambda$  approx. of 5 nm) UV-radiation in the field of 310-350 nm is received. Dependencies, describing influence of discrepancies of installations of **crystal** on the power of the 2nd harmonic radiation are detd.

L13 ANSWER 34 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1996:434284 HCPLUS  
DN 125:126937  
TI Absolute measurement of the effective **nonlinearities** of KTP and BBO **crystals** by optical parametric amplification  
AU Armstrong, D. J.; Alford, W. J.; Raymond, T. D.; Smith, A. V.  
CS Department of Lasers, Sandia National Laboratories, Albuquerque, NM, 87185-1423, USA  
SO Applied Optics (1996), 35(12), 2032-2040  
CODEN: APOPAI; ISSN: 0003-6935  
PB Optical Society of America  
DT Journal  
LA English  
AB Abs. magnitudes of the effective **nonlinearity**,  $d_{eff}$ , were measured for 7 KTP and 6 BBO **crystals**. The  $d_{eff}$ 's were derived from the parametric gain of an 800-nm signal wave in the sample **crystals** when they were pumped by the frequency-doubled, spatially filtered light from an injection-seeded, Q-switched Nd:YAG **laser**. The KTP **crystals**, all type II phase matched with propagation in the X-Z plane, had  $d_{eff}$  values ranging from 1.97 to 3.50 pm/V. Measurements of gain as a function of phase velocity mismatch indicate that 2 of the KTP **crystals** clearly contain multiple ferroelec. domains. For 5 type I phase-matched BBO **crystals**,  $d_{eff}$  ranged from 1.76 to 1.83 pm/V, and a single type II phase-matched BBO **crystal** had a  $d_{eff}$  of 1.56 pm/V. The uncertainty in the measurements of  $d_{eff}$  values is  $\pm 5\%$  for KTP and  $\pm 10\%$  for BBO.

L13 ANSWER 35 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1996:277093 HCPLUS  
DN 124:327802  
TI Generation of picosecond **laser** radiation at  $\lambda = 87.8$  nm with 1 kHz repetition rate  
AU Kutzner, J.; Huhmann, A.; Zacharias, H.  
CS Institut fur Laser- und Plasmaphysik, Universitat-GH Essen, Essen, 45117, Germany  
SO Optical and Quantum Electronics (1996), 28(3), 283-9

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CODEN: OQELDI; ISSN: 0306-8919  
PB Chapman & Hall  
DT Journal  
LA English  
AB Coherent radiation at 87.78 nm is generated by four-wave mixing in Ar gas. Radiation of a mode-locked Nd:YLF **laser** at  $\lambda = 1053$  nm is regeneratively amplified at 1 kHz repetition rate. After frequency quadrupling in consecutive LBO and BBO **crystals**, the UV radiation at 263.35 nm is focused in Ar in front of a hollow capillary. Effects of gas d. on the XUV intensity are discussed.

L13 ANSWER 36 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1996:229564 HCPLUS  
DN 124:273961  
TI The study of the angle dependence of the effective **nonlinear** coefficient,  $d_{eff}$ , in BBO (beta barium borate)  
AU Lee, K.F.; Ahmad, H.B.  
CS Physics Department, University of Malaya, Kuala Lumpur, 59100, Malay.  
SO Jurnal Fizik Malaysia (1994), 15(4), 127-32  
CODEN: JFMAEU; ISSN: 0128-0333  
PB Universiti Malaya, Jabatan Fizik  
DT Journal  
LA English  
AB The effective **nonlinear** coeff.  $d_{eff}$  can be calcd. precisely by considering the informations gather from the walkoff and phase matching angles. The exptl. measurements of the walkoff angle in Type I BBO neg. **crystal** were used to provide the values of  $d_{eff}$  and its variation with the incident angle. The  $d_{eff}$  values of Type I and Type II BBO for the case of optical parametric oscillation using the 2nd harmonics of a Nd:YAG **laser** are discussed.

L13 ANSWER 37 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1995:619244 HCPLUS  
DN 123:155686  
TI Single-mode optical parametric oscillator system of BBO and KNbO<sub>3</sub> tunable from the visible (0.42. $\mu$ m) to the infrared (4. $\mu$ m)  
AU Fix, A.; Urschel, R.; Goeritz, G.; Wildt, D.; Borsutzky, A.; Wallenstein, R.  
CS Fachbereich Physik, Universitat Kaiserslautern, Kaiserslautern, 67663, Germany  
SO IEEE Nonlinear Opt.: Mater., Fundam., Appl. (1994), 42-4 Publisher: IEEE, New York, N. Y.  
CODEN: 61JJAJ  
DT Conference  
LA English  
AB In the present OPO-system the seed radiation is generated by a BBO-OPO with a wide mode spacing (of about 1 cm<sup>-1</sup>). This OPO - with a 2.5-mm-long BBO **crystal** in a 3.6-mm-long flat-flat mirror resonator - is pumped by an injection seeded frequency tripled Q-switched Nd:YAG **laser**. Despite the short **crystal** the OPO efficiency exceeds 25% at a 355 nm pump pulse energy of 30 mJ (3 times above threshold). For BBO the IR transparency limit restricts high power OPO operation to wavelengths shorter than 2.3 . $\mu$ m. For the generation of IR radiation at longer wavelengths the OPO **crystals** of choice are KTP or KNbO<sub>3</sub> (KNB). While transparency range and damage threshold of these **crystals** are similar, the effective **nonlinear** coeff. of KNB is about three times as high as the one of KTP. In the authors investigations a KNB-OPO was pumped by pulsed 1 .06 . $\mu$ m Nd:YAG radiation. The OPO consisted of a 7.8-mm-long **crystal** (type I,  $\theta = 41.\text{degree}.$ ,  $\phi = 00$ ) placed in a 12-mm-long flat-flat mirror cavity resonant for the signal wave. The energy d. at threshold was about 0.48 J

cm-2 and 0.58 J cm-2 for 1 % and 10% output coupling, resp. These thresholds are about 3 times higher than expected from theory. This may indicate that the value of the effective **nonlinearity** quoted in the literature is too large. The OPO wavelengths measured and calcd. [B. Zysset et al. (1992)] as function of the phase-matching angle are shown. As seen in this figure signal and idler wave are tunable in the range of 1.45-2.01 .mu.m and 2.27-4.0 .mu.m, resp., using two sets of mirrors. With appropriate mirrors the tuning range could be extended to 1.4 - 4.5 .mu.m. At pump energies of two times above threshold (82 mJ in a pump beam with 3 mm in diam.) and a 10% output coupler the OPO efficiency is about 14%. This corresponds to pulse energies exceeding 5 mJ at both the signal and idler wavelength. The OPO bandwidth increases with the signal wavelength from less than 5 nm at  $\lambda$  < 1.7 .mu.m to 15-30 nm at  $\lambda$  > 1.8 .mu.m. Narrowband single-mode operation was achieved by injection seeding with IR idler radiation of the single-mode BBO-OPO. In this way the KNB-OPO is a powerful source of tunable narrowband IR radiation.

L13 ANSWER 38 OF 43 HCPLUS COPYRIGHT 2003 ACS  
 AN 1995:474096 HCPLUS  
 DN 122:302108  
 TI Intracavity doubling in Ti:Sapphire  
 AU Asaki, M. T.; Backus, S.; Baldwin, C.; Shi, C.; Murnane, M. M.; Kapteyn, H. C.  
 CS Department Physics, Washington State University, Pullman, WA, 99164-2814, USA  
 SO Springer Series in Chemical Physics (1994), 60(Ultrafast Phenomena IX), 213-14  
 CODEN: SSCPDA; ISSN: 0172-6218  
 DT Journal  
 LA English  
 AB The authors demonstrated the use of intracavity frequency doubling in a self-modelocked Ti:Sapphire **laser** to generate pulses as short as 14 fs in the blue region of the spectrum. BBO, LBO and KDP were used as the doubling **crystals** in a std. Ti:Sapphire **laser** cavity. LBO gave an 18 nm bandwidth with 30 mW of av. power in each of two arms. Pulse durations as short as 14 fs were measured in this configuration. BBO gave an 11 nm bandwidth with 60 mW of av. power in each of two beams. Pulse durations as short as 17 fs were measured for this case. Some tunability of the fundamental, and hence the 2nd harmonic, was possible.

L13 ANSWER 39 OF 43 HCPLUS COPYRIGHT 2003 ACS  
 AN 1995:391264 HCPLUS  
 DN 122:226015  
 TI Frequency mixing of dual excitation pulses from Ti: Sapphire **lasers**  
 AU Akagawa, Kazuyuki; Wada, Satoshi; Nakamura, Akira; Tashiro, Hideo; Toyoda, Koichi  
 CS RIKEN, Wako, Japan  
 SO Reza Kagaku Kenkyu (1994), 16, 44-6  
 CODEN: RKAKDK; ISSN: 0289-8411  
 PB Rikagaku Kenkyusho  
 DT Journal  
 LA Japanese  
 AB The authors have developed a pulsed Ti: Sapphire **laser** system pumped with SH of an Nd: YAG **laser** for frequency mixing, which generates two synchronized pulses from two oscillators. The synchronization of two pulses was performed by controlling excitation energy of the oscillators. The **laser** system was successfully applied to the difference-frequency mixing (DFM) in a BBO **crystal**. The phase match conditions with pumping of the Ti: Sapphire

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**laser** system were calcd. for DFM in the BBO, AgGaS<sub>2</sub> and AgGaSe<sub>2</sub> **crystals**. The calcd. results show that a wide tuning range from 200 nm to 18 .μ.m can be obtained with the Ti: Sapphire **laser** system and its wave conversion.

L13 ANSWER 40 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1995:338374 HCPLUS  
DN 122:229173  
TI Design and synthesis of an ultraviolet-transparent **nonlinear** optical **crystal** Sr<sub>2</sub>Be<sub>2</sub>B<sub>2</sub>O<sub>7</sub>  
AU Chen, Chuangtian; Wang, Yebin; Wu, Baichang; Wu, Keche; Zeng, Wenlun; Yu, Linhua  
CS Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fujian, 350002, Peop. Rep. China  
SO Nature (London) (1995), 373(6512), 322-4  
CODEN: NATUAS; ISSN: 0028-0836  
PB Macmillan Magazines  
DT Journal  
LA English  
AB Powerful, tunable UV **laser** sources, required for many spectroscopy applications, rely on the. An improved material was developed by rational design, Sr<sub>2</sub>Be<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (SBBO), which shares (and in fact slightly improves on) all of the favorable NLO properties of KBe<sub>2</sub>B<sub>2</sub>O<sub>7</sub> (KBBF) and is easy to grow as large (so far up to 7 .times. 7 .times. 3 mm) **crystals** of high optical quality. The large SHG coeffs. and wide range of UV transparency make this material a promising candidate for frequency doubling into the UV. The **crystal** structure of KBe<sub>2</sub>B<sub>2</sub>O<sub>7</sub> was detd.

L13 ANSWER 41 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1995:300657 HCPLUS  
DN 122:118304  
TI High power tunable femtosecond visible and infrared light from a synchronized Ti:sapphire/Nd:YAG **laser** system by difference frequency mixing  
AU Villeneuve, D. M.; Fischer, I.; Stolow, A.  
CS Steacie Institute for Molecular Sciences, National Research Council of Canada, Ottawa, ON, K1A 0R6, Can.  
SO Optics Communications (1995), 114(1,2), 141-6  
CODEN: OPCOB8; ISSN: 0030-4018  
PB Elsevier  
DT Journal  
LA English  
AB High power, 20 Hz repetition rate difference frequency mixing of externally synchronized femtosecond Ti:sapphire **laser** radiation with harmonics of a phase locked picosecond Nd:YAG **laser**, in a BBO **crystal**, is shown to produce femtosecond pulses in the visible (666 nm) and IR (1.77 .μ.m) regions. Using 50 .μ.J of 760 nm amplified Ti:sapphire light, outputs of tens of microjoules at 666 nm, or several microjoules at 1.77 .μ.m, were achieved. This technique can be used to extend the tuning range (720-1000 nm) of the Ti:sapphire **laser** into the visible (550-700 nm) and the IR (1.1-2.0 .μ.m) regions of the spectrum.

L13 ANSWER 42 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1994:711164 HCPLUS  
DN 121:311164  
TI Femtosecond solid state light sources tunable around 193 nm  
AU Ringling, J.; Kittelmann, O.; Seifert, F.; Noack, F.; Korn, G.; Squier, J.  
CS Max-Born-Institut fur Nichtlineare Optik und Kurzzeitspektroskopie, Berlin, 12474, Germany

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SO Proceedings of SPIE-The International Society for Optical Engineering (1994), 2116(GENERATION, AMPLIFICATION, AND MEASUREMENT OF ULTRASHORT LASER PULSES), 56-65  
CODEN: PSISDG; ISSN: 0277-786X

DT Journal

LA English

AB Compact all-solid state **laser** sources are developed for femtosecond pulse generation tunable around 193 nm using high peak power Ti:sapphire oscillator/amplifier systems and phase matched sequential sum frequency conversion in 3 .beta.-Ba-borate (BBO) **crystals** arranged in different schemes. Using thin **crystals** and a delay line for optimization of the temporal overlap of the interacting pulses in the last conversion stage 190 fs optical pulses with pulse energies of >2. $\mu$ J at 193 nm at 20 Hz repetition rate and 170 fs pulses with pulse energies of up to 4 . $\mu$ J at 200 nm (0.8 . $\mu$ J at 193 nm) for 1 kHz repetition rate are produced with excellent spectral, temporal and spatial stability.

L13 ANSWER 43 OF 43 HCPLUS COPYRIGHT 2003 ACS  
AN 1993:91182 HCPLUS  
DN 118:91182

TI **Nonlinear** optical anhydrous borates: the peculiarities of **crystal** growth

AU Leonyuk, N.; Leonyuk, L.  
CS Geol. Dep., Moscow State Univ., Moscow, 119899, Russia

SO Proceedings of SPIE-The International Society for Optical Engineering (1992), 1839(Solid State Lasers New Laser Mater.), 310-23  
CODEN: PSISDG; ISSN: 0277-786X

DT Journal

LA English

AB **Crystals** RA13(BO3)4 (R = Y, La and lanthanoids), .beta.-BaB2O4 and LiB3O5, serve for **laser** radiation conversion from UV to mid-IR. The process of their flux **crystn.** is limited by a specific process for each material. In the case of RA13(BO3)4, it is the sepn. of the BO3-triangles. For .beta.-Ba2O4, the limiting factor is the formation of isolated 3-fold rings B3O6. Finally, regrouping of 3-dimensional polymers limits the **crystn.** of LiB3O5. These processes are usually accompanied by the change of coordination no. of B from 4 to 3 and vice-versa. For YA13(BO3)4 the growth activation energy is as much as 335 kJ/mol. For **crystal** growing, the limiting concn. of borates are: 20-30 wt.% (system RA13(BO3)4, K2Mo3O10-R2O3-B2O3), 59 wt.% (NdAl3(BO3)4-BaO.2Ba2O3), 77.5 mol% (BaB2O4-Na2O), 97 mol.% (LiB3O5-B2O3).

L15 ANSWER 13 OF 22 HCAPLUS COPYRIGHT 2003 ACS  
AN 1991:32606 HCAPLUS  
DN 114:32606  
TI Lasing characteristics of tunable MALSAN-200 series radiation center  
lasers.  
AU Basiev, T. T.; Zverev, P. G.; Karpushko, F. V.; Konyushkin, V. A.;  
Kulashchik, S. M.; Mirov, S. B.; Morozov, V. P.; Motkin, V. S.;  
Papashvili, A. G.; et al.  
CS Inst. Obshch. Fiz., USSR  
SO Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya (1990), 54(8), 1450-5  
CODEN: IANFAY; ISSN: 0367-6765  
DT Journal  
LA Russian  
AB The lasing characteristics were studied of tunable lasers based on  
crystals with color centers, serving as the basis of com.  
developed lasers of the MALSAN-200 series. These lasers, operating at  
room temp., are designed for obtaining high-power continuously tunable  
radiation in the near-IR range of spectra. The basic active media used in  
this study were LiF:F2- radiation-colored crystals with an  
initial absorption coeff.  $K_{abs}$  ( $\lambda = 1.06 \mu\text{m}$ ) = 0.5-1.0  
 $\text{cm}^{-1}$  and with a length of 8 cm and crystals of LiF:(F2 .fwdarw.  
F2+), using the process of 2-stage photoionization for creating an active  
lasing band. In com. lasers of the MALSAN-200 series, radiation of  
nanosecond duration, continuously tunable in the near-IR region of the  
spectra from 0.84 to 1.25  $\mu\text{m}$  with a conversion efficiency of the  
pumping radiation of  $\text{ltoreq.}20\%$  and lasing line width of  $<0.3 \text{ cm}^{-1}$  is  
provided. The conducted studies led to a modification of the optical  
scheme and to the creation of a more compact, single-channel laser  
MALSAN-203, providing the above-indicated laser parameters.